

# LUNG SURGERY



Treatment for Lung Problems

# When You Need Lung Surgery

Your healthcare provider is advising surgery for your lung problem. Surgery alone may treat your problem. Or you may need other treatments as well. It's normal to have questions or concerns about surgery. This booklet can help you learn more about lung surgery and what it may mean for you.



## What Is Lung Surgery?

Lung surgery involves entering the chest wall to get to the lung. There are 2 common ways to do this: **thoracoscopy** and **thoracotomy**. In some cases, a thoracoscopy may be done to help decide whether a thoracotomy is needed. Your provider will talk to you about the method you will have.

- **Thoracoscopy** is done using a thoracoscope. This is a thin, long tube that contains a light and camera. It sends live video from inside the body to a monitor. The provider can see inside the chest during surgery. Only small incisions are needed in the chest to insert the scope and other tools.
- **Thoracotomy** uses a single, larger incision in the side of the chest. The provider reaches the lung and performs the surgery through this incision.

## What Can Surgery Do for You?

The goals of surgery depend on your lung condition. If a problem was found in your lung during a routine test (such as an X-ray), surgery can help confirm the diagnosis. This is often true when a **mass** (lump of abnormal tissue) is found in your lung. Surgery may also be used to treat certain lung problems, such as a collapsed lung. If needed, surgery may be done to remove part or all of a lung.

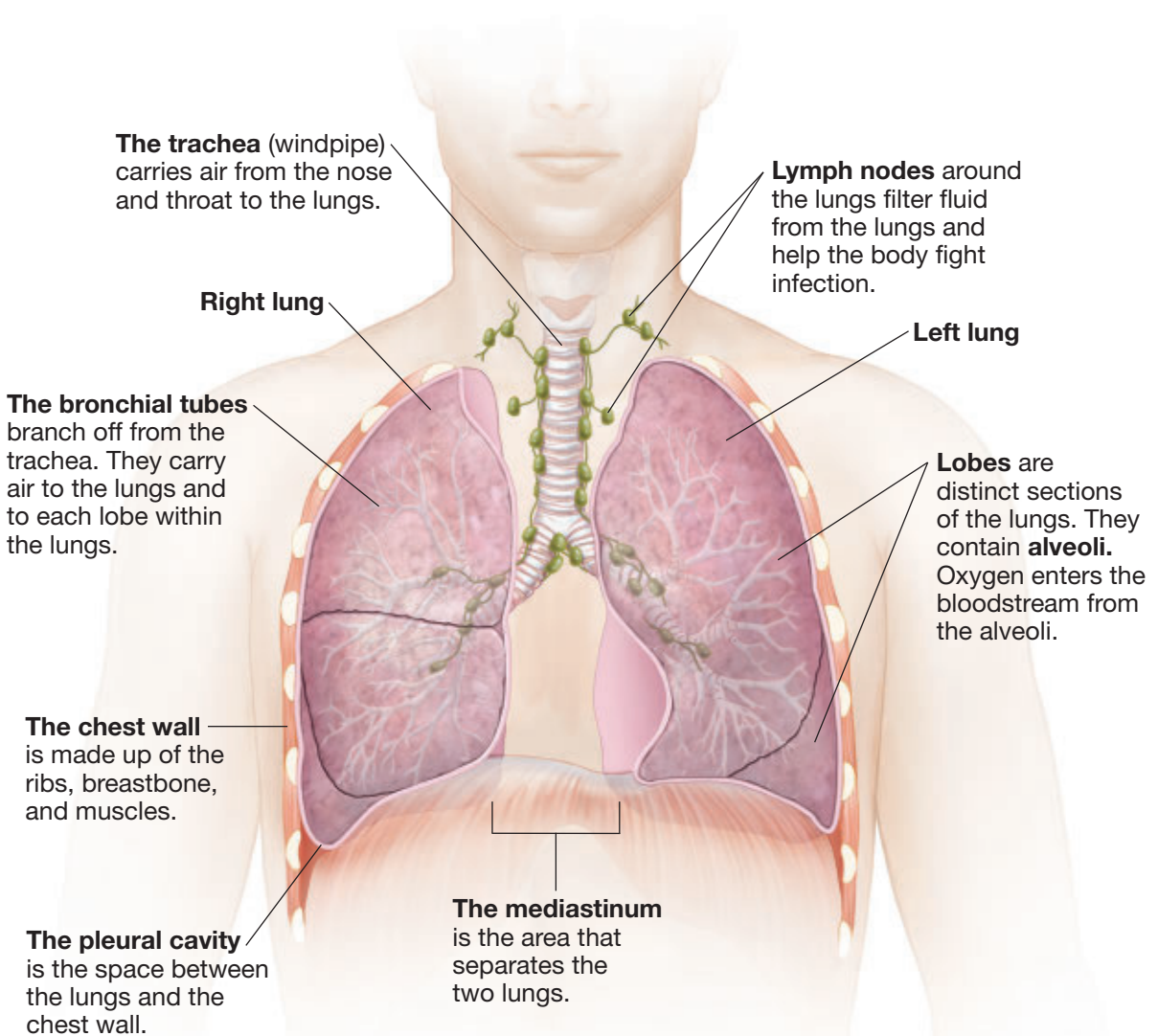
## Deciding On Surgery

Your provider will talk with you about lung surgery and how it may help. You will be told what's involved, how long recovery might be, and what kind of results are expected. Before making a decision about surgery, be sure to learn all of your treatment options. Be clear about the risks and benefits of each procedure and any other options. Also get answers to any questions you may have. By being informed, you can help your provider ensure that your needs are met.



# Inside Normal Lungs

The two lungs are located in the chest cavity. This is the space inside the rib cage. Each lung is divided into sections called **lobes**. There are 3 lobes in the right lung and 2 lobes in the left. Air flows into and out of the lungs and lobes through **bronchial tubes** (breathing passages). Each lobe contains many tiny air sacs called **alveoli**.



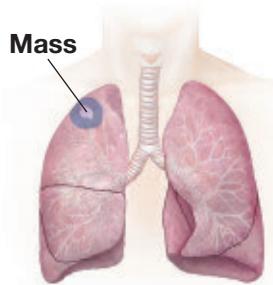


# Common Reasons for Lung Surgery

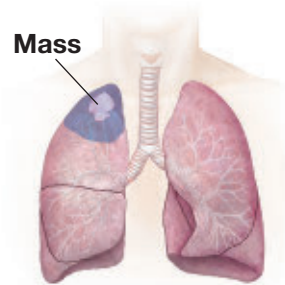
Surgery is often done to get a closer look at the inside of the lungs and to help treat lung problems. If a mass is found in the lung, surgery can help find its cause. If needed, the mass may also be removed. Surgery may be done for other problems as well, such as a collapsed lung or fluid around the lung.

## A Lung Mass

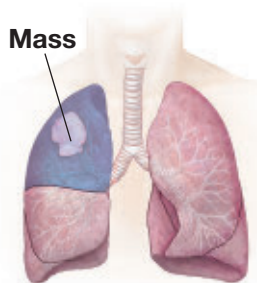
If a mass has been found in the lung, tissue samples from the mass can be removed during surgery. This is called a **biopsy**. It allows the provider to check whether the mass is **benign** (not cancerous) or **malignant** (cancerous). Other areas can also be checked to determine whether the mass has spread. If the mass needs to be removed, its size, location, and spread determine how much of the surrounding lung also needs to be removed. Removal of part or all of a lung is called lung **resection**.



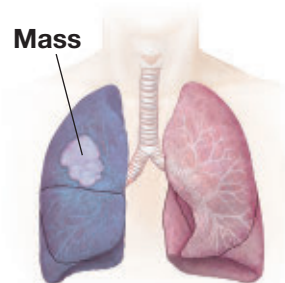
**Wedge resection** removes a small portion of a lobe.



**Segment resection** removes a larger portion of a lobe.



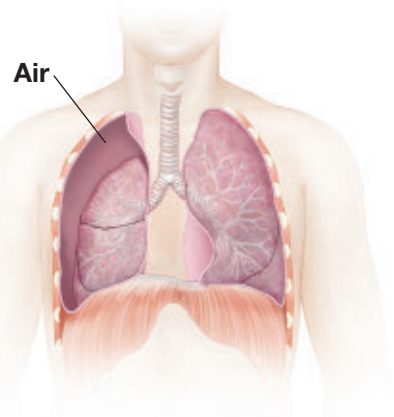
**Lobectomy** removes an entire lobe.



**Pneumonectomy** removes an entire lung.

## A Collapsed Lung

If a part of the lung is thin or ruptured, air may leak into the **pleural cavity**. This is the space between the lungs and the chest wall. If air collects here, the lung may collapse. This is called **pneumothorax**. Tubes placed during surgery can drain air from the pleural cavity so the lung re-expands. During surgery, the lung can also be repaired so that it's less likely to collapse again.



## Other Lung Conditions

Fluid may collect in the pleural cavity around the lungs. One common cause of this is a lung infection. During surgery, tubes can be placed in the pleural cavity to drain fluid and help the lungs heal.

# Your Evaluation

To help your provider evaluate your lungs, a number of tests and procedures may be done. The results can help you and your provider plan your surgery and decide whether other treatments are needed. You may have already had some of these tests and procedures. Others may be scheduled before your surgery.

## Lung Function Tests

Certain tests show how well your lungs work. They can include:

- **Spirometry**, which measures how much air your lungs can hold and how much air is left in your lungs after you exhale. It also measures how fast you can empty your lungs of air.
- **Pulse oximetry**, which measures how much oxygen is passed from your lungs to your blood.
- **Arterial blood samples**, which show how much oxygen is in your blood.

## Imaging Tests

Imaging tests provide pictures of your lungs. Chest X-rays are often done first. You may then have one or more of the tests below:

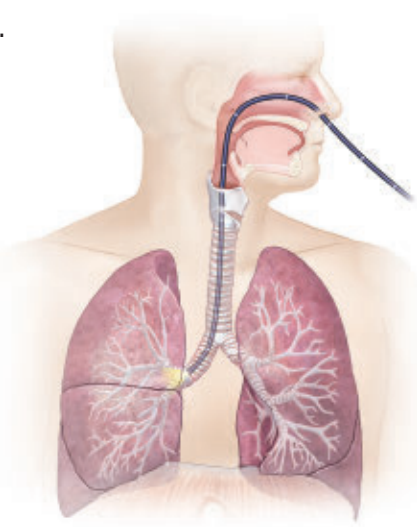
- **A CT scan**, which uses special X-rays and computers to take detailed pictures of the lungs from many angles.
- **An MRI scan**, which uses strong magnets and computers to form detailed pictures of the lungs.
- **A PET scan**, which uses a safe radioactive substance and special camera to check for problems in the lungs.



## Other Procedures

You may be advised to have certain procedures to show the inside of the lungs and the area around the lungs. To prevent pain during these procedures, medicine called **anesthesia** may be used. You'll be told more about this as needed. Possible procedures include:

- **Bronchoscopy.** A thin, lighted tube (bronchoscope) is used to look directly into breathing passages. The scope is inserted through the nose or mouth. Tissue samples may be removed and checked for problems. Also saline (saltwater) may be sent through the scope to wash the lungs in fluid. Samples of the fluid may then be checked for problems. During bronchoscopy, ultrasound (called endobronchial ultrasound, or EBUS) may be used to make images of the lungs and nearby lymph nodes.
- **Mediastinoscopy.** A tube is placed through an incision above the breastbone to look at the area between the lungs. Tissue samples may be removed and checked for problems.
- **Fine needle aspiration.** A thin needle is inserted through the chest wall or a bronchoscope to collect samples of tissue or fluid.
- **Mediastinotomy.** An incision is made in the chest wall to examine the lymph nodes in the chest. This procedure may be done in very specific situations. But it's not as common as other procedures.



**Bronchoscopy** gives the provider a closer look at your breathing passages.

## If You Have Lung Cancer

If it is confirmed that you have lung cancer, you will likely need other treatments in addition to or instead of surgery. Your provider will review your options with you. These depend mainly on the type and location of the cancer in your lung and the extent, or **stage** of the cancer. In early stages, cancer may be confined to one small part of the lung. In later stages, it may spread within the lungs or through the lymph nodes to other parts of the body. Treatment options for lung cancer may include:

- **Surgery**, which removes part or all of a lung to try to eliminate the cancer.
- **Radiation therapy**, which uses high-energy X-rays to destroy cancer cells.
- **Chemotherapy**, which uses special medicines to destroy cancer cells.

# Thoracoscopy

**Thoracoscopy is also called video-assisted thoracoscopic surgery or VATS. It is often used to repair a collapsed lung. It may also be used to biopsy and remove a mass or 1 or more lobes of the lung. Or it may be done to drain fluid from around the lungs. Thoracoscopy uses only a few small incisions in the chest wall. If a thoracoscopy can't be continued safely, a thoracotomy may be done.**

## Preparing for Surgery

- Tell your provider about all the medicines you take. This includes prescription and over-the-counter medicines, herbal remedies, and supplements. Also mention if you take aspirin or medicines to prevent blood clots. You may need to stop taking some or all of these before surgery.
- Do your best to quit smoking. This will help limit certain risks of surgery.
- Stop eating and drinking before surgery as instructed.

## The Surgical Procedure

- An intravenous (IV) line will be put into a vein in your arm or hand. This line provides fluids and medicines.
- To prevent pain during surgery, you'll be given medicine called **anesthesia**. This will likely be general anesthesia. It puts you into a state like deep sleep throughout the surgery.
- Several small incisions are made in your side.
- The scope is put through one of the incisions. It sends live video of the inside of your chest to a monitor. Surgical tools are put through the other incisions to treat your lung problem.
- One or more chest tubes may be placed to drain fluid and air for a short time after surgery. Then, incisions are closed with stitches (sutures) or staples.



**Possible incision sites for thoracoscopy.**

## Risks and Complications



*The risks of thoracoscopy can include:*

- Infection
- Bleeding
- Air leak from the lung
- Pain or numbness at the incision site
- Inflammation of the lungs (pneumonia)
- Risks of anesthesia





## Recovering in the Hospital

After surgery, you'll wake up in a recovery area. At first you may feel groggy and thirsty. Pain medicines will be given as needed. Later, you'll be moved to a hospital room. To aid your recovery, nurses or therapists will teach you exercises to keep your lungs clear. They will also help you get up and walk. This helps prevent blood clots. It also lowers the risk for problems such as pneumonia. After thoracoscopy, you may need to stay in the hospital for about 1 to 4 days. If you have chest tubes, you likely won't go home until they are removed.

## Recovering at Home

An adult family member or friend must drive you home. At home, follow instructions you've been given. Be sure to:

- Take all medicines as directed.
- Care for your incisions as directed.
- Continue to do breathing exercises as directed.
- Walk as often as you feel able. This will help your recovery.
- Avoid heavy lifting and strenuous activities as instructed.
- Ask your provider about when you may return to work. Also ask when you may resume driving, exercise, and sex.
- Follow up with your provider as directed. They will check your healing and discuss the results of the procedure.



## When to Call the Provider



*During recovery, call your provider right away if you have any of these:*

- Sudden, sharp chest pain
- Sudden, severe shortness of breath
- Fever of 100.4°F (38°C) or higher, or as directed by your provider
- Increased pain, redness, warmth, swelling, bleeding, or drainage at the incision sites
- Coughing up bright red blood

# Thoracotomy: The Procedure

**Thoracotomy is done through a single large incision in the side of the chest. This gives your provider a direct view of your lung. During surgery, various treatments may be done, such as removing part or all of a lung if a mass is present. Your provider can tell you more about what will be done during your procedure.**

## Preparing for Surgery

- Tell your provider about all the medicines you take. This includes prescription and over-the-counter medicines, herbal remedies, and supplements. Also mention if you take aspirin or medicines to prevent blood clots. You may need to stop taking some or all of these before surgery.
- Do your best to quit smoking. This will help limit certain risks of surgery.
- Stop eating and drinking before surgery as instructed.



## Receiving Anesthesia

To prevent pain during a thoracotomy, you will be given medicine called **anesthesia**. This will likely be general anesthesia. It puts you into a state like deep sleep throughout the surgery. Other methods to relieve pain, such as a nerve block or epidural, may also be used. If you have questions about anesthesia, be sure to discuss them with the anesthesia care provider before the procedure.

## Risks and Complications



*The risks of thoracotomy can include:*

- Bleeding
- Infection
- Inflammation of the lungs (pneumonia)
- Air leak from the lung
- Abnormal heart rhythm (arrhythmia)
- Blood clots in the leg or in the lung
- Risks of anesthesia



## The Surgical Procedure

- An intravenous (IV) line will be put into a vein in your arm or hand. This line provides fluids and medicines.
- The anesthesia is started.
- An incision is made across your side. The ribs along the incision are then separated to access the lungs.
- The lung to be operated on is deflated. A breathing tube helps your other lung continue working during surgery.
- The deflated lung can then be examined and any necessary procedure performed. This includes removing part or all of the lung. In some cases, nearby lymph nodes may be removed as well.
- When the procedure is finished, the lung is reinflated. One or more tubes are placed in the chest to drain air and fluid for a short time after surgery.
- The rib cage is repaired. The muscle is repaired with stitches (sutures). The skin is then closed with stitches or staples.



**Possible incision site**  
for thoracotomy.

## Notes to Family and Friends

- Expect the surgery to take 2 to 5 hours. Plan activities to help pass the time while you wait.
- After surgery, you may be able to visit your loved one within a couple of hours.
- When you visit, be prepared to see your loved one surrounded by tubes and monitors. They may be groggy, pale, and puffy-looking. This is normal after major surgery.
- Be aware that the pain medicines that help make your loved one more comfortable may also make them sleepy or confused.

# Thoracotomy: Hospital Recovery

**After surgery, you'll be moved to a recovery area where you can be closely monitored. From there, you may go to a special care unit or straight to a hospital room. The hospital stay after a thoracotomy varies for every patient, but it's often about a week.**

## Right After Surgery

When you first wake up from the anesthesia, you may feel groggy, thirsty, or cold. You may have a tube in your throat to help you breathe. You won't be able to talk with the breathing tube in. Your throat may also be sore from the breathing tube. Your IV line will remain in place to give you fluids and medicines. Monitors near your bedside record your heartbeat and the amount of oxygen in your blood.

## Getting Up and Moving

Soon after surgery, you will be encouraged to get up and move around. A nurse or therapist will help you sit up and walk. This helps prevent blood clots. It also helps lower the risk of problems such as pneumonia.

## Managing Your Pain

You will be given IV or oral medicine to control pain. Or you may have a special pump that allows you to give yourself a measured dose of pain medicine. Be honest about how much pain you feel. Tell your nurse if the medicines don't control pain or if you start to feel worse.





## Respiratory Therapy

After the breathing tube has been removed, you will be taught exercises to keep your lungs clear. The exercises include **incentive spirometry**, where you put your mouth around a plastic device and inhale as much air as you can. You will also be taught coughing and deep-breathing exercises and other breathing techniques. You will be asked to perform these regularly on your own.



## Range-of-Motion Exercises

While you're in the hospital, a nurse or therapist may teach you some range-of-motion exercises. These help stretch and strengthen the muscles on the side of surgery to keep your shoulder moving freely. You may also be taught exercises to do at home while you heal.

## Going Home

Before you leave the hospital, your provider will review the results of the surgery with you. They will also tell you what to expect during recovery. You and your provider can also schedule follow-up visits and discuss any further treatment you may need for your condition. When you're ready to leave the hospital, have an adult friend or family member drive you home.



# Thoracotomy: Home Recovery

**For the first few weeks after your surgery, you'll be gaining a little more energy and strength each day. Take things slowly, and rest when you get tired. To help ensure a healthy recovery, follow all home care instructions you receive from your provider.**

## Caring for Your Incision

You may shower once you get home. But don't bathe in a tub until your provider says it's OK. When you shower, wash your incision gently with warm (not hot) water and mild soap. Bruising, itchiness, soreness, and some numbness at your incision site are normal for a few weeks after surgery.

## Taking Medicines

Take medicines as directed by your provider. Take any pain medicines on time and as instructed. Don't wait until the pain gets bad before you take them. In some cases, you may be prescribed oxygen to use for a short time.



## Easing into Activity

Follow instructions for getting back to your routine. You may be told to:

- Walk each day to improve blood flow, lung capacity, and strength. You'll likely feel short of breath at first. This is normal and will improve with time.
- Take pain medicines as directed before activity. This can help make breathing more comfortable.
- Avoid actions that might stress your healing incisions, such as heavy lifting.
- Check with your provider before returning to work, driving, exercise, and sex.

## When to Call the Provider



*During recovery, call your provider right away if you have any of these:*

- Sudden, sharp chest pain
- Sudden, severe shortness of breath
- Fever of 100.4°F (38°C) or higher, or as directed by your provider
- Increased pain, redness, warmth, swelling, bleeding, or drainage at the incision sites
- Coughing up bright red blood
- Rapid or skipping heartbeat

# Looking Toward the Future

**Recovering from major surgery can be hard on your emotions as well as your body. A diagnosis of cancer can cause added stress and concern. Talk to your provider about your feelings. Also stay close to your family and friends who can help and support you.**

## Dealing with Your Emotions

It's common to feel depressed and anxious after surgery. You might feel energetic and cheerful one day, then tired and cranky the next. You may even have trouble sleeping or eating. If the surgery was for cancer or suspected cancer, you may also feel scared. Try to reach out to those around you. Share your feelings with your loved ones and let them know how they can help.



## Following Up with Your Provider

As you recover from the surgery, you'll see your provider for regular follow-up visits. During these visits, your healing and recovery can be monitored. Your provider can also discuss your plan of care with you and outline your options if you need further treatment.

## Notes to Family and Friends

- Your loved one might feel depressed, frustrated, or scared during their recovery. This is common. You might even feel that way yourself. Talk about your feelings with each other.
- If your loved one had surgery for cancer, you may have concerns about that as well. Joining a support group might help you and your loved one.
- Let your loved one do what they feel able to do. Offer encouragement, and try not to be overprotective.



## Working with Your Provider

Surgery allows your provider to treat your lung problem. If you have questions about surgery, be sure to discuss them with your provider. Keep in mind that the more prepared you are for surgery, the better your experience is likely to be. To help ensure a successful surgery:

- Follow all pre-op and post-op instructions.
- Have support at home during your recovery.
- Keep all follow-up appointments.

## Resources

The resources below can help you learn more about lung conditions, lung surgery, and other treatments. They can also help you find support:

- **American Lung Association**  
lung.org, 800-548-8252
- **American Cancer Society**  
www.cancer.org, 800-227-2345
- **National Cancer Institute**  
www.cancer.gov, 800-422-6237

Also available in Spanish

**TAKE OUR PATIENT SURVEY.** Help us help other patients.  
Please visit **www.KramesSurvey.com** to provide your feedback on this booklet.

This booklet is not intended as a substitute for professional medical care.  
Only your healthcare provider can diagnose and treat a medical problem.  
©2016, 2021 Krames, LLC. **www.kramesstore.com 800.333.3032**  
All rights reserved. Made in the USA.

